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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,322	08/01/2003	Munenori Oizumi	TI-35909	5221
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EXAMINER ROSARIO, DENNIS				
ART UNIT 2624		PAPER NUMBER		
NOTIFICATION DATE 03/11/2009		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com

Office Action Summary

Application No.

10/632,322

Applicant(s)

OIZUMI ET AL.

Examiner

Dennis Rosario

Art Unit

2624

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/30/08 has been entered. Claims 1-5 are pending.

Response to Arguments

2. Applicant's arguments filed 12/30/08 have been fully considered but they are not persuasive.

Applicants state that the combination does not show a motivation to combine the references. The examiner respectfully disagrees since the examiner has provided beneficial reasons as applicants have pointed out on page 3 of the remarks for combining the references.

Applicants state that there is no evidence in the art that shows a reasonable expectation of success. The examiner agrees since the art would not explicitly say use this particular reference, as the examiner has figured using reasoning, to combine the references in a way of the rejection. Applicants suggest that there is no reasonable expectation of success. The examiner's reasoning is to use references that have parallel teachings or structures that can easily intersect to have a reasonable expectation of success since they are parallel or similar and a reason why as discussed

in the previous remark, above. The examiner believes that this was reasonably done in the combination of Kim, Muzilla and Jensen.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-5 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 1 is not tied to a particular machine under the 35 U.S.C. 101 Machine Test or claim 1 does not represent data as a physical object and does not have an external depiction under the 35 U.S.C 101 transformation analysis. Thus, claims 2-5 are rejected, too.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Patent 5,653,234) in view of Muzilla et al. (US Patent 5,735,797) further in view of Jensen (US Patent 6,859,659 B1).

Regarding claim 1, Kim teaches a method of image filtering, comprising:

(a) computing a modified autocorrelation (fig. 2, num. 108 and "variance" in col. 1, lines 59-63 that based on autocorrelation) in a horizontal direction (or "same direction" in col. 1, lines 43-50 that is understood to be "any direction" in col. 1, lines 21-25 which implies the claimed horizontal direction) for each pixel (represented in equation (1) as "x" of column 1: "pixels" in col. 4, lines 14-16) in an image (fig. 2: I and Q), wherein the modified autocorrelation coefficient (not disclosed in Kim) is computed utilizing:

$$p=R(1)/(R(0)+d) \text{ (in col. 1, lines 60-63: note that the equation in column 1}$$

is not utilized to compute the claimed coefficient and that weight is not given to the structure of the claimed equation only function and number of variables such as division and addition and three variables);

(b) filtering (fig. 2, num. 114) said image with a lowpass filter (fig. 2, num. 114 is a "lowpass filter": abstract), wherein said filtering (fig. 2, num. 114) adaptively changes (corresponding to "adjustable pass band": abstract) according to (or based on) the computed modified auto-correlation (fig. 2 ,num. 108); and

(c) interpolating (fig. 2:114 outputs an averaged image as indicated in fig. 1: AVERAGED SIGNAL where averaging is a form of interpolating) said image (fig. 2: I and Q) and said filtered image from step (b) (Kim does not disclose interpolating said filtered image from step (b)) wherein said interpolating (fig. 2, num. 114) at said each pixel depends upon (or based on) said autocorrelation (fig. 2, num. 108) in said (same) horizontal direction.

Kim does not teach the claimed:

- a) modified autocorrelation and
- b) modified autocorrelation coefficient is computed utilizing the claimed equation and
- c) interpolating said filtered image from step (b).

Instead, Kim teaches autocorrelation that is "typically": col. 1, lines 41-50 computed according to said equation (1) and teaches and ARCTAN function in fig. 2, num. 116 following a filtered image upon the output of fig. 2, num. 114 to obtain a velocity measure.

Regarding the claimed interpolating said filtered image from step (b), Muzilla teaches interpolating as shown in fig. 9. num. 124A said filtered image from step (b) represented in fig. 9 as num. 126A: a detailed view in fig. 10 that shows an adaptive filter 136 and 138 which generates the claimed filtered image from step (b) that is subsequently interpolated in fig. 9, num. 124A.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Kim's filtered image of fig. 2, num. 114 of obtaining a velocity measure with Muzilla's teaching of obtaining a velocity measure represented in Muzilla in fig. 9 as VELDATA based on interpolating in fig. 9, num. 124A, because Muzilla's teaching provides a visual display of flow data such as velocity instead of just obtaining velocity as done in Kim. Thus, Muzilla enhances Kim calculation of velocity visually.

The combination still does not teach the claimed modified autocorrelation, but Kim of the combination states that a typical autocorrelation computation is used to obtain a velocity from which said variance is computed; thus, variance is a function of autocorrelation or broadly a modification of autocorrelation.

Jensen teaches "traditional autocorrelation" in col. 2, lines 5-10 and "standard autocorrelation" in col. 4, lines 46-48 and teaches "a new autocorrelation estimator" in col. 1, lines 15-19, which is the claimed modified autocorrelation, because the new autocorrelation estimator modifies the traditional autocorrelation by introducing equation (26) with coefficient " $1/k$ " in column 6 which is based on traditional autocorrelation equations (24) and (25) in column 5 as discussed in col. 6, lines 6-16 that includes characteristics of the claimed equation such as requiring division, sum and three variables. Thus, " $1/k$ " is the claimed modified autocorrelation coefficient based on equations (24) and (25).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Kim's typical autocorrelation with Jensen's teaching of traditional autocorrelation with the new autocorrelation, because Jensen's new autocorrelation is "new and improved" in col. 1, lines 60-63.

Regarding claim 5, Muzilla of the combination teaches:

- (a) said image is a color channel of a color image ("color map" in abstract).
7. Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Patent 5,653,234) in view of Muzilla et al. (US Patent 5,735,797) further in view

of Jensen (US Patent 6,859,659 B1) or Jensen I further in view of Jensen (A New Method for Estimation of Velocity Vectors) or Jensen II.

Regarding claim 2, Kim teaches with said image (said I and Q of fig. 2) of step (c) replaced by said interpolated image (upon the output of fig. 2, num. 114) using said modified auto-correlation in said horizontal direction and does not teach the remaining limitations of claim 2 and instead uses the horizontal direction for correlation "for any given direction" in col. 1, lines 20-24.

Jensen of the combination teaches axial and transverse directions determined from autocorrelation functions: column 5: equations (24) and (25) which is an improvement of the prior art as discussed in col. 1, lines 60-63 and the method of claim 1, further comprising:

(a) a horizontal direction (or axial direction) replaced (during estimation of a "Velocity transverse" in col. 2, lines 44-46 that cannot use the axial direction and a transverse direction must be used, thus replacing the axial direction with a transverse direction during estimation of the transverse direction) by a second direction (as shown by any one of transverse arrows of fig. 1), said second direction perpendicular (as show in fig. 4 that shows axes that are perpendicular) to said horizontal direction (axial direction).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Kim's teaching of autocorrelation at any given direction with Jensen's teaching of axial and transverse directions which would result in the claimed repeating of clam 1 the only difference being a perpendicular direction, because Jensen

has identified a "common problem" (Jensen II, page 837, left column) with ultrasound to measure velocity and provides a solution.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Patent 5,653,234) in view of Muzilla et al. (US Patent 5,735,797) further in view of Jensen (US Patent 6,859,659 B1) further in view of Kim et al. (US Patent 5,544,658).

Regarding claim 3, Jensen provides standard autocorrelation and modifies the standard autocorrelation as discussed in claim 1, above.

Kim teaches "modified auto correlation" in col. 3, line 17 and claim 3 of

(a) said modified auto-correlation ("modified auto correlation" in col. 3, line 17) of step (a) of claim 1 is $R_{xx}(1)/(R_{xx}(0) + \delta)$ (see equation "(1)" in column 3 and equation (9) in column 8) where $R_{xx}(\cdot)$ is the auto-correlation function for the pixel values in an interval about said each pixel and with the DC component removed (via fig. 5,num. 34), and where δ is a parameter (or "variables" in col. 8, line 22).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Jensen's teaching of auto-correlation with Kim's teaching of the modified auto-correlation, because Kim's modified auto-correlation remedies the deficiencies of auto-correlation with respect to "aliasing" in col. 3, line 9 or noise.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Patent 5,653,234) in view of Muzilla et al. (US Patent 5,735,797) further in view of Jensen (US Patent 6,859,659 B1) further in view of Kim et al. (US Patent

5,544,658) as applied in claim 3, above, further in view of Hall et al. (US Patent 5,363,851).

Regarding claim 4, the combination does not teach claim 4, but Jensen teaches modifying autocorrelation as discussed in claim 1, above.

Hall teaches a modified auto-correlation as shown in fig. 4, num. 60 and claim 4 of:

a) $R_{xx}(1)/(R_{xx}(0) + \delta)$ (as shown in fig. 4,num. 60) exceeds a threshold (fig. 4,num. 68).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Jensen's teaching of auto-correlation with Hall's modified auto-correlation and threshold, because Hall teaching provides "accurate velocity estimation" in col. 2, line 12.

Allowable Subject Matter

10. The following claim 1 drafted by the examiner and considered to distinguish patentably over the art of record in this application, is presented to applicant for consideration:

(a) computing a modified autocorrelation in a horizontal direction for each pixel in an image, wherein computing includes a modified autocorrelation coefficient equal to (also the each variable needs defined in the claim):

$$p=R_{xx}(1)/(R_{xx}(0)+d);$$

(b) filtering said image with a lowpass filter, wherein said filtering adaptively changes according to the computed modified auto-correlation; and

(c) interpolating said image and said filtered image from step (b) wherein said interpolating at said each pixel depends upon said autocorrelation in said horizontal direction.

The examiner believes that the primary art, Kim (US Patent 5,653,234), of record does not clearly use the equation as a coefficient since Kim, while teaches using autocorrelation as shown in equations (1) and (2) in column 1, does not clearly teach using autocorrelation as a coefficient since equation (1) is an equation that is autocorrelation that is not used as a coefficient and equation (2) has said autocorrelation twice as a numerator and denominator. Thus, the examiner suggests that the claimed autocorrelation equation **is (emphasis added)** a coefficient which is distinct from a denominator and numerator and autocorrelation itself. Support is found in equation (14) of applicant's specification.

Note that Jensen (US Patent 6,859,659) uses autocorrelation as a coefficient in equations (22)-(25). However, Jensen's coefficients are believed to be different than applicant's coefficient given that Jensen's coefficients appear to be equal to equation (18) that is clearly different from applicant's coefficient.

Note that Muzilla (US Patent 5,735,797) teaches equation (8) that closely resembles applicant's claimed coefficient equation and invites applicant's representative to discuss the claimed and disclosed "δ" that appears to distinguish over Muzilla.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chen et al. (BREAST CANCER DIAGNOSIS USING SELF-ORGANIZING MAP FOR SONOGRAPHY) is pertinent as teaching a method of a "modified...autocorrelation coefficient" on page 406, right column, middle paragraph that closely resembles applicant's modified autocorrelation coefficient's equation.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario whose telephone number is (571) 272-7397. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dennis Rosario/

/Matthew C Bella/

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Supervisory Patent Examiner, Art
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